

*Further Note, with a Correction, on the Spectrum of the Sun-spot of June 1889. By the Rev. A. L. Cortie, S.J.**(Communicated by E. W. Maunder.)*

In a former note on the spectrum of this important spot (*Monthly Notices*, vol. 1., No. 2), the behaviour of the calcium lines in the region B to D was discussed. A comparison was also made with some calcium lines, in a list of bright lines, seen in a metallic prominence over the same spot, by Professor Spörer, of Potsdam, on June 28. A revised list was subsequently published by Professor Vogel (*Nature*, January 9, 1890), from which the calcium lines 6726·5, 6717·16, 6492·41 have been eliminated, and a line of iron (6677·6) and one of barium (6496·31) in the region under discussion have been substituted. A corresponding correction must, therefore, be made in the column headed "Prominence, June 28," of the table appended to my former note (*loc. cit.*, p. 65). Both these lines occur in Young's list of chromospheric lines. In the spot the iron line was widened 0·6 when observed on June 24, and the barium line, the widening of which is difficult to estimate on account of the surrounding telluric haze, was but slightly widened, if at all. The following remarks, in addition to those already published, contain the most noteworthy points with regard to the spectrum of the spot:—

1. The general absorption was dark, and the total number of lines observed as widened, or otherwise affected in the spot, was about two hundred and ten.
2. Of these the most widened lines included, besides calcium lines, lines of iron, titanium, and sodium. Barium and manganese were not much affected in the spot, nor was nickel, except the line between the D lines, which on June 20 was less dark over the spot, and on the 24th and 26th was not widened at all. The proportion of metallic lines among the most widened lines was greater than at the maximum Sun-spot epoch.
3. The most widened of all the metallic lines was the iron line 6148·28, which seemed to be surrounded by a broad and fuzzy band. Estimated widening, 5·0. This is one of Young's bright lines. Ångström draws it much darker than I see it.
4. Many faint lines were among the most widened lines. Among these were the lines 6039·4 (Fievez), 6053·28, and 6061·7 (F), lines which appear in this class, both in maximum and minimum spots. Also the doubles 6243·49, 42·60; and 6240·51, 39·42; which were either considerably widened on the more refrangible side, or displaced to the violet. The line 6305 (F) widened 3·0, was of the same breadth throughout over the spot, showing a steep-sided spot, and yet other lines were unmistakably of the usual spindle shape where widened.

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5. A faint line 6209.3 was seen only over the spot, widened 5.0. This line is in Angström's map, but neither in his nor Burton's catalogue; nor does it appear in the maps of Kirchhoff, Smyth, or Fievez. It was seen in the spectra of Sun-spots, always much widened, in 1884-5-6, at Stonyhurst. It was not seen in that of May 6, 1889. A careful search was made for the line on May 21, but it could not be detected. It reappears in the June spot.
6. A few faint lines were obliterated where they crossed the spot, none of them metallic lines.
7. The following table exhibits the results for the "basic" lines :—

Wave-length.	Elements.	Mean Widening.	Remarks.
*† 6064.70	Fe + Ti	0.5	
*† 6101.92	Ca + Li	0.7	
*† 6121.34	Ca + Co	0.8	
† 6154.41	Na + Fe	2.0	
6255.51	Fe + Ti	0.9	
* 6346.34	Ru + Ir	0.3	
*† 6392.87	Fe + Sb	0.6	
† 6407.38	Fe + Sr	0.5	
† 6438.35	Ca + Cd	1.2	
† 6449.29	Ca + Ba	1.2	
*† 6461.98	Fe + Ca	1.2	Bright in prominence June 28.

On the Proper Motion of Groombridge 1830.

By W. T. Lynn, B.A.

It is now nearly fifty years since the large proper motion of *Groombridge 1830* was detected by Argelander. In the *Monthly Notices* for June 1870 (vol. xxx., p. 203), I put together the results of the observations which had been obtained at the Royal Observatory, Greenwich, of this star, taking the places from the successive great catalogues from the twelve-year (epoch 1845) to the second seven-year (epoch 1864), which was then passing through the press under my own immediate superintendence. Perhaps it may be acceptable if I now complete this by adding the results from the catalogues (the nine-year for 1872, and the ten-year for 1880), which have been since published. It will be noticed that no fewer than 90 observations in R.A. and 100 in N.P.D. have been made at Greenwich of this remarkable

* Bright in chromosphere, Young.

† Resolved either by Liveing and Dewar, or by Fievez.